

BEST AVAILABLE COPY



UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office

Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231

#10

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
-----------------	-------------	----------------------	---------------------

08/907,182 08/06/97 YAMAZAKI

S 07977/023002

020985 IM52/0706
FISH & RICHARDSON, PC
4350 LA JOLLA VILLAGE DRIVE
SUITE 500
SAN DIEGO CA 92122

EXAMINER

DIAMOND, A
ART UNIT PAPER NUMBER

1753
DATE MAILED:

07/06/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No. 08/907,182	Applicant(s) YAMAZAKI ET AL.	
	Examiner Alan Diamond	Art Unit 1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 September 2000.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 26-30, 32-55, 57-76, 78, 79, and 81-102 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 26-30, 32-55, 57-76, 78, 79, and 81-102 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 08/623,336.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- | | |
|--|--|
| 15) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 18) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 16) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 19) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 17) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>17, 20</u> . | 20) <input type="checkbox"/> Other: _____ |

Art Unit: 1753

DETAILED ACTION

Claim Rejections - 35 USC § 102/103

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 34, 39, 59, 64, 76, 78, 79, 83, 87, 89-93, 95, 99, and 102 are rejected under 35 U.S.C. 102(e) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Funada et al, U.S. Patent 5,614,426.

Funada et al prepares a semiconductor device, wherein an amorphous i-type silicon film (104) is provided on insulating film (102) of silicon oxide; said amorphous silicon film is provided with nickel catalyst; and then the amorphous silicon film is crystallized by heating (causing the nickel to diffuse through the silicon film and promote crystallization thereof) (see col. 2, line 51 through col. 4, line 44; col. 7, line 4 through col. 8, line 9; col. 8, lines 62-63; and Figures 2A-2D). With reference to Figure 2D, phosphorus and boron impurities are then ion implanted using an accelerating voltage, and the result is n-type impurity regions (114) and (116) from the phosphorus

Art Unit: 1753

implantation, and p-type impurity regions (111) and (113) from the boron implantation (see also col. 8, line 35 through col. 9, line 2). It is the Examiner's position that the ion implanted phosphorus reads on the instant gettering layer. Subsequently, annealing and recrystallization are performed with excimer laser and heating so as to activate the impurities resulting from the ion implantation (see the paragraph bridging cols. 8 and 9). It is the Examiner's position that during this annealing and recrystallization, the nickel in the channel-forming region (115) of the silicon film is inherently gettered into the adjacent phosphorus doped n-type regions (114) and (116) of the silicon film. The original amorphous silicon film can be formed, for example, by plasma CVD or sputtering (see col. 4, lines 5-26; col. 7, lines 37-39). It should be noted that the nickel permits the crystallization to occur at a lower temperature than a temperature of crystallization without the nickel (see col. 3, lines 54-58). The concentration of the nickel can be, for example, 1×10^{15} atoms/cm³ (see col. 4, lines 26-44). The nickel catalyst can be provided in a layer beneath or above the amorphous silicon layer (see col. 4, lines 5-26). The dose amount of phosphorus atoms in the ion implantation is, for example, 2×10^{15} cm⁻² (see col. 8, lines 43-44). Note that there is a junction between the n-type impurity region (114) and the p-type impurity region (113) (see Figure 2D). Since Funada et al teaches the limitations of the instant claims, the reference is deemed to be anticipatory.

In addition, the presently claimed gettering would obviously have occurred once Funada et al's process is performed. Note In re Best, 195 USPQ at 433, footnote 4

Art Unit: 1753

(CCPA 1977) as to the providing of this rejection under 35 USC 103 in addition to the rejection made above under 35 USC 102.

Claim Rejections - 35 USC § 103

4. Claim 94 is rejected under 35 U.S.C. 103(a) as being unpatentable over Funada et al, U.S. Patent 5,614,426.

Funada et al prepares a semiconductor device, wherein an amorphous i-type silicon film (104) is provided on insulating film (102) of silicon oxide; said amorphous silicon film is provided with nickel catalyst; and then the amorphous silicon film is crystallized by heating (causing the nickel to diffuse through the silicon film and promote crystallization thereof) (see col. 2, line 51 through col. 4, line 44; col. 7, line 4 through col. 8, line 9; col. 8, lines 62-63; and Figures 2A-2D). With reference to Figure 2D, phosphorus and boron impurities are then ion implanted using an accelerating voltage, and the result is n-type impurity regions (114) and (116) from the phosphorus implantation, and p-type impurity regions (111) and (113) from the boron implantation (see also col. 8, line 35 through col. 9, line 2). It is the Examiner's position that the ion implanted phosphorus reads on the instant gettering layer. Subsequently, annealing and recrystallization are performed with excimer laser and heating so as to activate the impurities resulting from the ion implantation (see the paragraph bridging cols. 8 and 9). It is the Examiner's position that during this annealing and recrystallization, the nickel in the channel-forming region(115) of the silicon film is inherently getterred into the adjacent phosphorus doped n-type regions (114) and (116) of the silicon film. The original amorphous silicon film can be formed, for example, by a CVD method, such as

Art Unit: 1753

plasma CVD, or by sputtering (see col. 4, lines 5-26; col. 7, lines 37-39). It should be noted that the nickel permits the crystallization to occur at a lower temperature than a temperature of crystallization without the nickel (see col. 3, lines 54-58). The concentration of the nickel can be, for example, 1×10^{15} atoms/cm³ (see col. 4, lines 26-44). The nickel catalyst can be provided in a layer beneath or above the amorphous silicon (see col. 4, lines 5-26). The dose amount of phosphorus atoms in the ion implantation is, for example, 2×10^{15} cm⁻² (see col. 8, lines 43-44). Note that there is a junction between the n-type impurity region (114) and the p-type impurity region (113) (see Figure 2D). Funada et al teaches the limitations of the instant claims other than the difference which is discussed below.

Funada does to specifically teach that its amorphous silicon film can be prepared by low pressure CVD, as per claim 94. However, as noted above, Funada et al teaches that its amorphous silicon film can be formed, for example, by a CVD method. It is conventional and well-known in the art that an amorphous silicon film can be formed by a low pressure CVD method. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have formed Funada et al's amorphous silicon film using a low pressure CVD method because it is conventional and well-known in the art that an amorphous silicon film can be formed by a low pressure CVD method.

Double Patenting

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA

Art Unit: 1753

1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claims 26-30, 32-55, 57-76, 78, 79, and 81-102 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-30 of U.S. Patent No. 6,251,712. Although the conflicting claims are not identical, they are not patentably distinct from each other because the additional processing steps in the claims of said patent, such as forming gate electrodes, are not excluded by the comprising language of the instant claims. Note, in particular, claim 6 of said patent, where a metal-containing material is used for promoting crystallization of the amorphous silicon, and phosphorous is used for gettering.

7. Claims 26-30, 32-55, 57-76, 78, 79, and 81-102 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 39-43, 45-50, 85, 87, 88, and 90-146 of copending Application No. 08/928,750. Although the conflicting claims are not identical, they are not patentably distinct from each other because the method in the claims of said copending application renders obvious the instant method. Note, in the claims of said copending application, that the catalyst metal is gettered from the channel regions using phosphorus.

Art Unit: 1753

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alan Diamond whose telephone number is 703-308-0840. The examiner can normally be reached on Monday through Friday, 6:30 a.m. to 3:00 p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 703-308-3322. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.



Alan Diamond
Primary Examiner
Art Unit 1753

Alan Diamond
June 27, 2001